

## CLAIMS

1. Process for improving the fertilization activity of spermatozoa, in particular for increasing spermatozoa motility, comprising treating the spermatozoa with a phosphatidylinositol-3 kinase (PI3K) inhibitor.
2. Process according to claim 1, wherein treating the spermatozoa with a phosphatidylinositol-3 kinase (PI3K) inhibitor is performed on seminal liquid comprising the spermatozoa.
3. Process according to claim 1 or 2, further comprising separating the spermatozoa by spermatozoa separation methods used in assisted reproduction techniques (ART).
4. Process according to claim 3, wherein separating the spermatozoa is performed by a method selected from the wash and spin method, the sedimentation method, the direct swim-up method, the pellet and swim-up method, the buoyant density gradient method.
5. Process according to claim 4, wherein separating the spermatozoa is performed by the direct swim-up method.
6. Process according to any of claims 1 to 5, wherein the process is performed on mammal spermatozoa, in particular on human spermatozoa.
7. Process according to any of claims 1 to 6, wherein the PI3K inhibitor is selected from the group consisting of 2-(4-morpholinyl)-8-phenyl-4H-1-benzopyran-4-one (LY294002), wortmannin, quercetin, and derivatives and analogues thereof.
8. Process according to claim 7, wherein the PI3K inhibitor is LY294002.
9. Process according to any of claims 1 to 8, wherein spermatozoa are treated with an amount of PI3K inhibitor in the range of about 0.01 to 1000  $\mu\text{M}$ , about 5 to 500  $\mu\text{M}$ , or about 10 to 100  $\mu\text{M}$ .
10. Process according to any of claims 1 to 9, wherein treating the spermatozoa with the PI3K inhibitor comprises incubating the spermatozoa for a period of time in the range of about 30 minutes to 10 hours or about 1 to 8 hours or about 2 to 6 hours at a temperature of around 37°C.

10043013-042902

Sub G17

Sub G2

- 11. Spermatozoa in which the activity of the phosphatidylinositol-3 kinase is inhibited.**

12. Spermatozoa obtainable by the process according to any of claims 1 to 10.

13. Use of a PI3K inhibitor for improving the fertilization rate in assisted reproduction techniques (ART).

14. Use according to claim 12, wherein the assisted reproduction techniques are selected from in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT), or intrauterine insemination (IUI).

15. Use of a phosphatidylinositol-3 kinase (PI3K) inhibitor for the manufacture of a medicament for the treatment of infertility, in particular male infertility.

16. Use of a phosphatidylinositol-3 kinase (PI3K) inhibitor for the manufacture of a medicament for improving spermatozoa fertilization activity, in particular for increasing spermatozoa motility.

17. Use according to any of claims 13 to 16, wherein PI3K inhibitor is selected from the group consisting of 2-(4-morpholinyl)-8-phenyl-4H-1-benzopyran-4-one (LY294002), wortmannin, quercetin, and derivatives and analogues thereof.

18. Use according to claim 16, wherein the PI3K inhibitor is LY294002.

19. Method of ART therapy, comprising treating spermatozoa with a phosphatidylinositol-3 kinase (PI3K) inhibitor.

20. Method according to claim 19, wherein the ART are selected from in vitro fertilization (IVF), gamete intrafallopian transfer (GIFT), or intrauterine insemination (IUI).

21. A medium for storage and/or transportation of spermatozoa comprising a phosphatidylinositol-3 kinase (PI3K) inhibitor.

22. Medium according to claim 21 for the storage and/or transportation of mammal spermatozoa, in particular human spermatozoa.

23. Medium according to claims 21 or 22, wherein the PI3K inhibitor is selected from the group consisting of 2-(4-morpholinyl)-8-phenyl-4H-1-benzopyran-4-one (LY294002), wortmannin, quercetin, and derivatives and analogues thereof.

24. Medium according to claim 23, wherein the PI3K inhibitor is LY294002.

25. Medium according to any of claims 21 to 24, comprising an amount of PI3K inhibitor in the range of about 0.01 to 1000  $\mu\text{M}$ , about 5 to 500  $\mu\text{M}$ , or about 10 to 100  $\mu\text{M}$ .

2006240-EP0840007

Add a 5